

REPORT

Transition of Weather and Climate Forecasts into Effective Decision-Making Tools

Principal Investigator: Qi S. Hu, Associate Professor, School of Natural Resources, University of Nebraska-Lincoln, Lincoln, NE 68583-0728

Report period: July 1 – December 31, 2005

Routine project meetings were organized to review progress and plan for next step analysis. After extensive discussions we have decided to focus on a couple of popular farming decisions and develop *ThinkAboutIt* decision-making modules that will demonstrate an effective way to improve understanding and use of weather and climate forecasts in decision-making. The two decisions are irrigation scheduling and purchasing crop insurance. The former is frequently made during the growing season for farmers in the western Corn Belt, and requires short-term predictions of a variety of weather parameters, e.g., precipitation, temperature, wind, as well as soil moisture. The latter is a once a year decision for most farmers, and requires long-term (as well as short-term) forecasts of precipitation, temperature, and water resource availability.

We have designed a generic framework that uses the *ThinkAboutIt* tool to educate decision makers and train and guide their use of forecasts in making these and other specific decisions. This generic framework is illustrated in the attached Power Point presentation (this is a static “script” of the materials that will be built in a more dynamic and interactive decision-support module, and does not show many decision support functions of the module).

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Report period: January 1 – August 31, 2006

After completing design of the generic framework that we use to educate farmers about weather and climate forecasts and show farmers how these forecasts should be understood and used in farming decisions, we applied it to a specific farming decision: irrigation. After specifying the potential forecasts that can be used in making the decision: Shall I irrigate my field? we organized two workshops and invited irrigation experts to evaluate the relevance of the forecasts and examine how those forecasts should be interpreted so that farmers can understand them and use them properly in making the irrigation decision. After each workshop our research team worked to further revise and develop the contents of the decision-making tool for this specific decision. At the end of this reporting period we have a complete module of the decision-making tool that focuses on use of two specific weather products in making irrigation decisions. A copy of this module is attached.

This module has a complete structure for our decision-making tool for this specific irrigation decision and other decisions as well. In this tool we have both expert coaching and expert feedback to show farmers how each of the weather and climate forecasts should be understood and used in the irrigation decision. The coach also reminds farmers other factors he should consider when using a specific weather product or forecast. In expert feedbacks, the farmers can hear the advice of an expert of irrigation as to how a particular weather product or forecast can be integrated in the current condition the farmer is in and with other available forecasts and observations to make an effective irrigation decision. Additionally, user of the tool can interact with his peers who are also using this tool, and see how they are making their decisions and learn from each other on using forecasts and weather products in making the decision.

This tool has a set of pre-measure and a set of post-measure questions for users to answer. Their answers will serve as the benchmark to measure how the coaching and expert feedback and peer interactions can improve farmer understanding of weather and climate products and forecasts and use them effectively in making this specific decision. In addition, we have used a set of questions to measure several psychological factors affecting decision-making. These questions are designed based on our previous study of farmer decision-making (funded by NOAA HDGCR program), and their answers will allow us to evaluate the reasons of decision behavior of farmers. From analyzing these reasons we will be able to understand why farmers use or do not use forecasts and weather products in making their decisions, and design effective ways to improve use of forecasts and weather products in farming productions.

Currently, this “script” of the irrigation decision-making tool is being coded into the *ThinkAboutIt* computer interface, and this work should be completed in December 2006.